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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER
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ART UNIT	PAPER NUMBER
1762	

DATE MAILED: 08/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

mk-15

Office Action Summary	Application No.	Applicant(s)	
	09/753,630	HOSSAINY ET AL.	
	Examin r	Art Unit	
	Jennifer Kolb Michener	1762	

-- The MAILING DATE of this communication app ars on th cover sh t with the correspond nce address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 June 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *40-48 and 50-99* is/are pending in the application.

4a) Of the above claim(s) *63-77,82-84 and 89-99* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *40-48,50-62,78-81 and 85-88* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *10.5* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Election/Restrictions

1. Newly submitted claims 75-77, 82-84, and 89-99 are directed to inventions that are independent or distinct from the invention originally claimed for the following reasons: the medical devices and materials of these claims have been non-elected without traverse in paper 4 as Groups II and III.

2. Newly submitted claims 63-74 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: claims 63-74 are independent from the method claims originally claimed, in that they have different functions and effects. Claims 63-74 require the use of an adhesion enhancer in the second of two hemocompatible coatings present on the substrate, which is not required by the originally claimed invention. Particularly, the instant specification teaches (page 10) that adhesion enhancers are useful in adhering heparin to metal surfaces, therefore their use in the second coating would have a different function and effect.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 63-77, 82-84, and 89-99 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Currently claims 40-48, 50-62, 78-81, and 85-88 are pending.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 53-59 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement and as non-enabling due to the term "aromatic quaternary ammonium", as outlined in the previous office action.

This rejection is maintained.

5. The rejection of claims 37 and 40-48 has been withdrawn in light of cancellation of claim 37.

The following new 112, 1st rejections are made:

6. Claims 53-60, 40-48, and 61 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Regarding claims 60, 40-48, and 61, the word "polymeric" regarding the "adhesion enhancer" of claim 60 step c) appears to be new matter. Examiner is unable to find, in the originally-filed disclosure, basis for this limitation. While Applicant teaches

some "typical", exemplary polymeric enhancers (page 10 of the instant specification), there is no basis for claiming all polymeric enhancers.

Regarding claims 53-59, the phrase "a copolymer of ethylene with vinyl alcohol" appears to be new matter. The originally-filed disclosure teaches the use of "ethylene vinyl alcohol copolymer" or "EVAL" as the adhesion-enhancing substance in the multicomponent coating embodiment (that which is claimed in claims 53-59) of the invention, but there is no basis for claiming all copolymers containing both ethylene and vinyl alcohol.

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. The rejections of claim 48 under 112, 2nd, concerning DURAFLO, have been withdrawn based on Applicant's amendments.

Claim Interpretations

9. The term "DURAFLO" has been interpreted to be inclusive of all ionically bound heparins, as now outlined in currently amended claims.

Claim Rejections - 35 USC § 102

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

11. Applicant has asked for clarification of Examiner's use of the 102(e) form paragraph in the previous office action stating that the application was examined under pre-AIPA standards. Examiner wishes to clarify that this form paragraph was entered into the office action in error. Examiner apologizes for any confusion caused by this inadvertent error.

Based on Applicant's amendment, the addition of new claims, and the disqualification of Hossainy as prior art, the following new rejections are made:

12. Claims 60-62, 50-51, and 78-80 are rejected under 35 U.S.C. 102(b) as being anticipated by Onishi et al. (5,670,558).

Regarding claims 60 and 78, and as outlined in previous office actions, Onishi teaches a method of coating an implantable device (col. 12) by applying a coating of heparin (col. 11, line 50) in ethylene vinyl alcohol copolymer ("EVAL") or other polymers (col. 8, line 45; col. 11, line 58). The coating of Onishi improves the antithrombotic action of the implant and increases lubricity (col. 11, line 40), which increases biocompatibility and hemocompatibilty (col. 1, line 58), as required by the claim. EVAL (as taught in the instant specification to enhance adhesion of coatings to substrates) and other polymers

act as the adhesion enhancers required by the claim. Onishi teaches that the coating layer can release heparin into the blood to exhibit antithrombotic action (col. 12, line 14), which inherently releases a "therapeutic amount", as required by the claim, because an amount sufficient to affect the therapeutic prevention of thrombosis is released.

Regarding claim 61, Onishi teaches coating a stent (col. 12, line 60).

Regarding claims 50 and 79, Onishi teaches polyvinyl alcohol (col. 8, line 44) as one of the polymers which acts as the adhesion enhancer.

Regarding claims 51 and 80, Onishi teaches dipping and dripping (a type of spraying) the coatings onto the substrates (Examples).

13. Claims 60-62 and 78 are rejected under 35 U.S.C. 102(e) as being anticipated by Goicoechea (6,010,530).

Goicoechea teaches coating stents with a solution of polymer and heparin (col. 4, line 45; col. 5, lines 5-11). The heparin leaches out from the polymer coating over time to produce a time-controlled leaching which inherently releases a "therapeutic amount", as required by the claim, because an amount sufficient to affect the therapeutic prevention of thrombosis is released.

The polymeric "skin" taught by Goicoechea inherently acts as an adhesion enhancer for the heparin coated to the stent as it ties the heparin down to the surface. Heparin, as

outlined above, enhances blood compatibility and bio-compatibility, as required by the claim.

Claim Rejections - 35 USC § 103

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

15. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

16. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

17. The various rejections of claims using the Hossainy reference have been withdrawn.

Based on Applicant's amendment, the addition of new claims, and the disqualification of Hossainy as prior art, the following new rejections are made:

18. Claims 58-59 and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Onishi in view of Rowland et al. (5,356,433).

Onishi teaches that which is disclosed above. Additionally, Onishi teaches that any thrombolytic agent may be used in his invention and provides, as noted above, heparin as a non-limiting example. Onishi fails to specifically teach any species of heparin chosen from the broad disclosed class of heparin compounds.

Rowland teaches the use of conjugates of ionic heparinous materials to enhance coupling of heparin to stent surfaces (col. 2). Examples provided by Rowland include heparin conjugated with benzylalkonium chloride or tridodecylmethylammonium chloride (TDMAC), which contain the aromatic quaternary ammonium ion, required by Applicant's claim (as taught in the instant specification, page 4). Rowland cites these ionically-bound conjugates as known in the art for leaching away from the stent, which would be useful in Onishi's invention which desires to release heparin into the blood. Since Onishi teaches the broad class of heparin suitable for coating stents and being releasable into blood and Rowland teaches heparin conjugates useful in enhancing ionic-reversible coupling of heparin to stents, Rowland would have reasonably

suggested the use of the quaternary ammonium ion conjugates of heparin in the method of Onishi. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the teachings of Rowland in the method of Onishi to provide Onishi with an adherent coating of heparin on his stents capable of being released into the bloodstream.

19. Claims 53-57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Onishi in view of Rowland as applied to claims 58-59 and 48 above, and further in view of Hostettler (6,030,656).

Onishi in view of Rowland teach that which is disclosed above regarding coating a stent with the claimed complex of heparin dispersed in EVAL to form a hydrogel coating (col. 5, line 26; col. 12, line 60; col. 11, lines 50, 59, and 62-65; col. 8, line 45).

Onishi does not specifically teach roughening the surface of the sent, however Examiner notes that roughening surfaces prior to coating to enhance adhesion of coatings to surfaces is well-known throughout the coating art from roads to furniture to metal fencing. Examiner cites Hostettler to teach the same, specifically regarding the medical field. Hostettler is directed to a method of coating stents and other medical devices with a hydrogel coating (abstract) in which he states that before coating metal substrates, metal substrates should be roughened to allow cohesiveness between the coating and the substrates (col. 10, lines 25-28). By removing impurities and increasing surface area, roughening enhances coating adhesion. Since Onishi in view of Rowland teaches coating metallic stents with hydrogel coatings and Hostettler teaches

roughening metallic stents prior to coating, Hostettler would have reasonably suggested roughening the substrate of Onishi in view of Rowland. It would have been obvious to one of ordinary skill in the art to use the teachings of Hostettler in the method of Onishi in view of Rowland to provide Onishi in view of Rowland with enhanced coating adhesion, which will provide a more durable coated product.

Regarding claims 54 and 55, Onishi teaches heat treating coatings within the range claimed by Applicant (col. 13, line 34).

Regarding claims 56 and 57, Examiner notes that when a polymer substrate is chosen, Hostettler teaches pre-treating the substrate with argon plasma (col. 9, line 67; col. 11, line 45). Additionally, Hostettler teaches the use of primers (col. 10, line 30). These teachings both would enhance coating adhesion and it would have been obvious to an ordinary artisan to use plasma or primer pretreatment in the method of Onishi and Rowland to enhance adhesion, as outlined above regarding roughening.

20. Claims 40-44, 52, 81, and 85-88 are rejected under 35 U.S.C. 103(a) as being unpatentable over Onishi in view of Hostettler.

Regarding claims 40, 52, 81, 85, and 87 Onishi teaches that which is disclosed above, but fails to teach roughening.

Hostettler teaches roughening, as disclosed above.

It would have been obvious to one of ordinary skill in the art to use the roughening teachings of Hostettler in the method of Onishi for those reasons outlined above in the "Onishi in view of Rowland and further in view of Hostettler" rejection.

Regarding claims 41-43, Hostettler teaches the use of primers, which would have been obvious for use in the method of Onishi for those reasons outlined above. Hostettler teaches the use of reactive silane primers (col 14, line 27).

Regarding claim 44, the baking limitation of claim 85, and claim 86 Onishi teaches heat-treating as outlined above in the temperature range of Applicant.

Regarding claim 88, Hostettler teaches the use of argon plasma etching above, which would roughen the surface and enhance adhesion. The use of Hostettler's teachings of plasma etching in the method of Onishi would have been obvious to one of ordinary skill in the art desiring to enhance coating adhesion and for those reasons outlined above.

21. Claims 45-47 rejected under 35 U.S.C. 103(a) as being unpatentable over Onishi in view of Hostettler as applied to claims 40-44, 81, and 85-88 above, and further in view of Shah (6,248,127).

Onishi and Hostettler teach the use of reactive silane primers, as outlined above, but fail to teach chlorosilane primers.

Shah teaches a number of reactive and other silane primers useful in linking heparin to stent substrates, such as trialkoxysilanes and tri-chlorosilanes, which have the functional heads required by Applicant (col. 5, liens 35-40).

Since Onishi in view of Hostettler teach the use of a primer to attach heparin complexes to stents and Shah teaches the use of chlorosilanes as a primer, Shah would have reasonably suggested the use of chlorosilanes as a coupling agent in Onishi and Hostettler. It would have been obvious to one of ordinary skill in the art to use the primer of Shah in the method of Onishi and Hostettler with the expectation of similar, successful heparin attachment to stents because Shah teaches the suitability of such primers in a similar coating operation.

Response to Arguments

22. Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

23. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

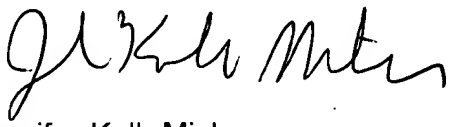
Yang et al. (6,258,121) teaches coating stents with polymers for controllably releasing an included therapeutic active agent (abstract; col. 2, lines 60-63; col. 4, lines 30; claim 9). The polymer adheres the active agent to the stent.

Fox, Jr. et al. (5,019,096) teaches coating a medical device with heparin and a polymer, which would act to enhance adhesion.

24. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer Kolb Michener whose telephone number is 703-306-5462. The examiner can normally be reached on Monday through Thursday and alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive P. Beck can be reached on 703-308-2333. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.



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